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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/828,550	HALPIN, MICHAEL W.
	Examiner	Art Unit
	Rudy Zervigon	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-10,13,14,46-48 and 58-68* is/are pending in the application.

4a) Of the above claim(s) *15-45 and 49-57* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-10,13,14,46-48 and 58-68* is/are rejected.

7)☒ Claim(s) *46-65* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 29, 2003 has been entered.

Claim Objections

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 46-65 been renumbered 49-68.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-4, 6-9, 13, 14, 46, 47, 58-65, and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnsgard et al (USPat. 6,342,691) in view of Shih et al (USPat. 6,120,640).

Johnsgard teaches a semiconductor (106; Figure 1; column 14, lines 20-35) processing apparatus (Figure 1; column 14, lines 20-35) comprising:

i. a reaction chamber (100; Figure 1; column 14, lines 20-35) and plural vitreous quartz components (130C, 130G; column 16, lines 54-60) that have a support surface (130C/130A and 130G/130B interface) for supporting other components (130A, 130B) in the reaction chamber, the support surface being covered at least in part by a devitrification barrier coating made of silicon nitride (column 17, lines 23-30) that is bonded (inherent) to the support surface and directly contacts the supported other components (see Figure 1)

ii. the devitrification barrier coating covers at least a portion of a quartz sheath (130D, E, H; Figure 6; column 16, lines 52-65) of a thermocouple (610; Figure 6; column 16, lines 8-25)

Johnsgard further teaches the apparatus further comprises an upwardly extending projection (110; Figure 1; column 14, lines 35-40) positioned on a support device (116), the projection and support device configured to support a substrate (106) within the apparatus (100).

Johnsgard does not teach the manner in which the devitrification barrier is coated by CVD. Johnsgard does not teach the thickness of the devitrification barrier or that the devitrification barrier covers only a portion of the vitreous components. Johnsgard does not teach that the projection being covered at least in part by the devitrification barrier coating.

Shih teaches protective barrier films for plasma facing components of reactor parts (column 5, lines 14-43). Specifically, Shih teaches the manner in which a silicon nitride (column 10, lines 50-55) devitrification barrier is coated by CVD. Shih teaches that the projection being covered at least in part by the devitrification barrier coating (column 5, lines 14-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Johnsgard to deposit his silicon nitride devitrification barrier coating by CVD over portions of his quartz vitrification parts as taught by Shih.

Motivation for Johnsgard to deposit his silicon nitride devitrification barrier coating by CVD over portions of his quartz vitrification parts as taught by Shih is drawn to an alternate and equivalent means for coating Johnsgard's silicon nitride devitrification barrier.

5. Claims 48, 66, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnsgard et al (USPat. 6,342,691) and Shih et al (USPat. 6,120,640) in view of Atsushi Koike (USPat. 5,065,698). Johnsgard and Shih are discussed above. Johnsgard and Shih do not teach that the devitrification barrier is deposited by sputtering. Atsushi Koike teaches a film forming apparatus (301; Figure 3) for sputter depositing silicon nitride (column 8, lines 10-20) to a thickness of 800 angstrom (column 10, lines 20-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Johnsgard and Shih to deposit his silicon nitride devitrification barrier coating to a desired thickness by sputter coating his quartz vitrification parts as taught by Atsushi Koike.

Motivation for Johnsgard and Shih to deposit his silicon nitride devitrification barrier coating to a desired thickness by sputter coating his quartz vitrification parts as taught by Atsushi Koike is drawn to an alternate and equivalent means for coating Johnsgard's silicon nitride devitrification barrier.

6. Claims 1-4, 6-9, 10, 13, 14, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wengert (USPat. 6,325,858) in view of Shih et al (USPat. 6,120,640).

The applied reference to Wengert (USPat. 6,325,858) has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Wengert teaches identical component parts (Figure 1) including vitreous quartz components (column 7, lines 19-22) coated over with silicon nitride devitreous "shields" (column 7, lines 19-30). Inclusive, Wengert teaches a reaction chamber (10; Figure 1) and plural vitreous quartz components (23, 24, 38; column 7, lines 19-30) that have a support surface (upper surface of 24) for supporting other components (20, 22; Figure 1) in the reaction chamber, the support surface being covered at least in part by a devitrification barrier coating made of silicon nitride (column 7, lines 22-33) that is bonded (inherent) to the support surface and directly contacts the supported other components (see Figure 1). Wengert further teaches the manner in which the devitrification barrier is coated by CVD (column 7, lines 23-33).

Wengert does not teach the thickness of the devitrification barrier or that the devitrification barrier covers only a portion of the vitreous components. Wengert does not teach that the projection being covered at least in part by the devitrification barrier coating.

Shih teaches protective barrier films for plasma facing components of reactor parts (column 5, lines 14-43). Specifically, Shih teaches the manner in which a silicon nitride (column 10, lines 50-55) devitrification barrier is coated by CVD. Shih teaches that the projection being covered at least in part by the devitrification barrier coating (column 5, lines 14-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Wengert to deposit his silicon nitride devitrification barrier coating at desired thicknesses over portions of his quartz vitrification parts as taught by Shih.

Motivation for Wengert to deposit his silicon nitride (column 7, lines 23-33) devitrification barrier coating at desired thicknesses over portions of his quartz vitrification parts as taught by Shih is drawn to an alternate and equivalent means for coating Wengert's silicon nitride devitrification barrier. Further, it would be obvious to those of ordinary skill in the art to optimize the thickness of the silicon nitride devitrification barrier. (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

7. Claims 46 and 48 are rejected under 35 U.S.C. 103(a) as being obvious over Wengert et al (USPat. 6,325,858) and Shih et al (USPat. 6,120,640) in view of Atsushi Koike (USPat. 5,065,698).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Wengert and Shih are discussed above. Wengert and Shih do not teach that the devitrification barrier is deposited by sputtering. Atsushi Koike teaches a film forming apparatus (301; Figure 3) for sputter depositing silicon nitride (column 8, lines 10-20) to a thickness of 800 angstrom (column 10, lines 20-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Wengert and Shih to deposit his silicon nitride devitrification barrier coating by sputter coating his quartz vitrification parts as taught by Atsushi Koike.

Motivation for Wengert and Shih to deposit his silicon nitride devitrification barrier coating by sputter coating his quartz vitrification parts as taught by Atsushi Koike is drawn to an alternate and equivalent means for coating Wengert's silicon nitride devitrification barrier.

Response to Arguments

8. Applicant's arguments filed December 29, 2003 have been fully considered but they are not persuasive.

9. Applicant argues that none of the cited references teaches a divitrification barrier coating on CVD equipment having a thickness of about 1 to 10,000 angstroms. With the exception of Atsushi Koike who teaches a film forming apparatus (301; Figure 3) for sputter depositing silicon nitride (column 8, lines 10-20) to a thickness of 800 angstrom (column 10, lines 20-26), the Examiner agrees to the extent that none of the references teach a divitrification barrier coating having a thickness of about 1 to 10,000 angstroms. For example, Shih, Hong et al teaches a thermal spray B_4C coating between 125-250μm (125 micrometre (μm) converts to 1,250,000 angstrom) – column 8, lines 8-28. However, as stated above, it would be obvious to those of ordinary skill in the art to optimize the thickness of the silicon nitride devitrification barrier. (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

In particular, it is well established that thermal isolation of any material, including CVD equipment, depends on both the thermal conductivity of the protective coating and the thickness

of the protective coating per Fourier's law[1] as demonstrated by Johnsgard, Kristian E. et al (column 18, lines 29-37):

$$k = -\frac{dQ/dt}{A\,dT/dx}$$

[1] Introduction to Materials Science for Engineers, 3rd Ed. James F. Shackelford, 1992 Macmillan Publishing Co., pp.398

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.